

PSYCHOLOGY 439
ADVANCED STATISTICAL METHODS FOR PSYCHOLOGY
Spring, 2016
Tuesdays & Thursdays 9:25 - 10:40
Room 133 Sewall Hall

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Office Hours: Tuesdays 1:00 – 2:00 PM and by appointment

Required text:

Statistical Methods for Psychology, Edition: 8

Author: David C. Howell

ISBN-13: 9781111835484

Publication Date: 2013 (2012 is also acceptable)

Publisher: Wadsworth, Cengage Learning

Available at Rice Bookstore [Please see note at end of syllabus]

Learning Outcomes

Upon successfully completing the course, the student will

1. Understand the theoretical foundations of univariate statistical tests.
2. Be able to choose and apply the correct parametric statistical test given the nature of the data and the experimental design.
3. Be able to set up an ANOVA source table for between-subjects, within-subjects, and mixed experimental designs.
4. Be able to use SPSS to analyze data sets exemplifying various univariate experimental designs.
5. Be able to interpret the results of various statistical tests from SPSS output.

General Philosophy on Teaching and Learning Advanced Statistics

My general philosophy on advanced statistics is that learning should go beyond knowing which statistical test to choose to analyze your data using SPSS or any other statistical software package or how to click your way through the SPSS menus to analyze the data. While that is certainly important, it is also important to understand why a particular statistical test tells you what you want to know and how that statistic is computed. For that reason, I will spend time explaining the theoretical foundations of various statistical tests. If you understand what a statistic estimates and how it does that, you are in a much better position to make informed decisions regarding data analysis when you encounter novel data sets.

It is also my philosophy that in an advanced statistics course, the tests should be open-book and open-notes. The reason for this is that in situations outside of class (e.g., your honors thesis research, your graduate research if you attend graduate school), you would typically have access to texts and other material when you encounter a data analysis problem. In other words, it is unlikely that you would undertake a data analysis without consulting available material relevant to that analysis. For that reason, I think that you should be able to consult your text and your notes (including copies of my lecture notes) as you take your exam.

Course Requirements and Grading

There are several pieces of work that will contribute toward your final grade in the course. These include several short in-class quizzes, homework from the chapters in the text, two unit exams, and a final data analysis project. The quizzes collectively will contribute 10% to your final course average, the homework assignments collectively will contribute 20%, each unit exam will contribute 20%, and the final project will contribute 30%.

Thus, the weighting to get the final course average will be:

Assignment	Weight
Quizzes	.10
Homework	.20
Exam 1	.20
Exam 2	.20
Final Data Analysis and Report	.30

By way of example, suppose that your average for the a) quizzes was 90%, b) homework assignments was 85%, your grades on c) Exams 1 and d) Exam 2 were 90% and 82%, and e) your grade on the final project was 88%. Then your final grade would be:

$$.10(90\%) + .20(85\%) + .20(90\%) + .20(82\%) + .30(88\%) = 86.8\% \text{ (Final course average)}$$

Final course letter grades are assigned as follows:

Percent	Letter Grade	//	Percent	Letter Grade
92 – 100%	A		72-77%	C
90-91%	A-		70-71%	C-

88-89%	B+		68-69%	D+
82-87%	B		62-67%	D
80-81%	B-		60-61%	D-
78-79%	C+	//	0-59%	F

Quizzes

Quizzes will be short, no more than 5 questions that can be answered with a sentence or two, or computations that can be done with a stand-alone calculator or with the calculator on your smart phone. The questions on the quizzes will be drawn from the text readings as well as from my lectures. Quizzes will be given in-class at the beginning of the period, closed-book and closed-notes (and no access to the internet), and *they will be unannounced*. This means that you should keep up with the reading and review my lectures before the next class period. There will be approximately one quiz every week to two weeks.

Homework Assignments

The homework consists mainly of answering the even-numbered problems at the end of assigned chapters. I will also supplement those problems for certain chapters with problems involving the analysis of data using SPSS (Statistical Package for the Social Sciences).

Statistical Software and In-Class Exercises - SPSS

As noted above we will use SPSS to implement the statistical procedures that we cover in lecture and in the text. We will spend some part of at least one lecture per week, going through exercises that will teach you how to use SPSS. Even if you learned and already know how to use SPSS, I am fairly certain that you could still benefit from reviewing some of the more basic procedures in SPSS and from seeing some of the more complex designs demonstrated in class (e.g., nested designs, mixed designs, etc.).

If you do not know SPSS, or if you would like a review, there are several texts that cover SPSS. Alternatively, you might find the following web site helpful. We will most likely be using this web site for our SPSS exercises as we move through the course. In addition to the web site, there is also a link at this site to the data files for the SPSS exercises. I will also put copies of those data files on Owlspace.

Here is the SPSS tutorial web site:

[Howell SPSS Tutorial](#)

Unit Exams

The two unit exams will cover material **both** from the text and from my lectures. These exams will be taken in-class. They will be open-book, open notes. The questions related to the text will be like those from the homework assignments that you have done. The questions from my lecture tend to be a mixture of computational and theoretical questions. Most likely, you will have had some homework or in-class problems similar to the computational-type questions before the exam, but not with the theoretical questions. There are two ways to ensure that you are prepared for the theoretical questions on the unit exams: 1) ***Ask questions in class when I cover the theoretical material***, and 2) ***Study the lecture notes that contain the theoretical concepts and ask me questions via email or via Owlspace***.

The Final Project

The final assignment in the course depends entirely on understanding how to analyze a set of data using SPSS and on how to interpret those analyses. I will provide the data sets to be analyzed for the final project. I will also provide a set of hypotheses to be tested using these data sets. Your job will be to select the correct statistical procedures, to test the hypotheses using those procedures, and to interpret the SPSS output. In a way, the final project is like a lab practical; that is, you need to demonstrate that you understand how to implement the various statistical procedures that we will learn. The final project will be a take-home assignment that will be due by 5:00 PM on May 2.

Policy on disabilities

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities should also contact Disability Support Services in the Ley Student Center.

Policy on late assignments

I know that everyone has emergencies of one sort or another that occasionally interfere with class. For this reason, everyone gets one (1) free late assignments (excluding exams or the final project), no questions asked. Even if you find that you have to turn in one assignment late, it still must be submitted within 48 hours of the original deadline to receive full credit. Once you have exhausted your one free late assignment, all other assignments submitted late will receive a maximum of half-credit.

Rice Spring, 2016 Calendar (Significant dates)

Jan. 11	Classes start
Jan. 12	First class period for PSYC 439
Jan. 18	Martin Luther King Holiday
Feb. 27 - March 6	Spring Break – no classes
March 31 – April 1	Midterm recess - no classes
Apr. 21	Last class period for PSYC 439
Apr. 22	Last day of classes

Apr. 27 - May 4 Final Exams

PSYC 439 Tentative Class Schedule (27 class periods)

Note: This is a very tentative schedule subject to change. If I think that we need to spend a little more time on a particular topic we will do that, or we might also cover a topic more quickly than is indicated on the schedule. It is likely that we will not get through all of these topics, but I will try to do so.

Date	Topic	Text Reading
January 12	Introduction, Pre-test (ungraded)	none
January 14 -21	Review of basic statistics, probability	Chapters 1, 2, 3 & 5
January 26 – 28	Hypothesis Testing	Chapters 4 & 7
February 2 – 4	Power analysis, One-way ANOVA	Chapters 8 & 11
February 9 – 11	One-way ANOVA, ANOVA Post-tests	Chapter 11 cont'd, 12
February 16 – 18	ANOVA Post-tests, Planned comparisons	Chapter 12 cont'd
February 23	Exam 1	Ch. 1, 2, 3, 4, 5, 7, 8, 11 & 12
February 25	Factorial designs	Chapters 13
February 27 - March 6	Spring break (no class)	
March 8	Factorial, nested designs	Chapter 13 cont'd
March 10 – 22	Repeated measures and mixed designs	Chapter 14
March 24 - 29	Correlation and regression	Chapter 9 & 10
March 31	Midterm Recess – No Class	
April 5	Correlation and Regression cont'd	Chapters 9 & 10
April 7	Exam 2	Ch. 9, 10, 13 & 14
April 12 - 14	Multiple regression	Chapter 15
April 19 – 21	Non-parametric tests	Chapter 6
May 2	Final project due by 5:00 PM	Comprehensive

Rice Honor Code

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at <http://honor.rice.edu/honor-system-handbook/>. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

You are not allowed to consult any other person inside or outside of class for help in answering a question that contributes to your final course grade. In other words, your final course grade is supposed to reflect what you know, not what someone else knows. That means that you may not discuss any of the questions on any of the assignments with another student in class nor with anyone outside of class in preparing or checking your answer to a question before you submit that assignment. The only exception to this policy is that you may certainly ask me for clarification of a particular question before you submit that assignment.

Use of the Internet in Preparing Assignments

You are certainly allowed to consult the internet (except on quizzes and on unit exams) for help in answering questions on your assignments. There are three restrictions on your use of the internet: 1) If you discover that the answers to assigned homework problems (even-numbered problems) are available on the internet¹, you are prohibited from using those answers in preparing your homework for submission, 2) You may not use any type of social media for help in answering questions on your assignments, and 3) You may not use a web site that allows you to plug in data and have it calculate answers for you unless I have given express permission to do so. For example, you are allowed on homework assignments and on the final project to use web programs that determine critical values of test statistics or that calculate probabilities based on particular statistical distributions (e.g., the normal distribution, the F distribution).

¹ Posting of those answers is a direct violation of an agreement that every faculty member who uses the text endorses to gain access to those answers.

A note about the textbook

I ordered the text through the Rice Bookstore. These are the prices that were reported to me when I ordered the text:

1. Print, new: \$305.65
2. Print, used: \$229.25 (25% Savings)
3. Print, new rental: \$198.65 (35% Savings)
4. Print, used rental: \$137.55 (55% Savings)
5. eBook, buy: \$215.50 (29% Savings)
6. eBook, rent (for 180 days): \$92.50 (70% Savings)

As the Professor in this course, I consider the price of the new text to be obscene, and I apologize for requiring a text that costs that much money. It is, unfortunately, one of a very few texts that cover the material in the course. I don't know how much of the price is markup by the Rice Bookstore, and how much of it is the price charged by the author and the publisher. Either way, there are alternatives to what is shown above, and you can find the text for much less at other places.

I will also put a copy of this text on reserve at the Rice University Library.

You can check this link first: [The Best Sites to Buy and Rent Textbooks](#)

You should be careful to make sure that you are getting the 8th edition.

For example, a search at Amazon yielded:

Premier Books USA – [Howell, D. C., *Statistical Methods for Psychology*, Edition: 8](#)

New
\$157.95
+ \$3.99 shipping
+ \$0.00 estimated tax

Arrives between January 14-29
Ships from FL, United States.
Expedited shipping available.

Note that it says that it could arrive anywhere from Jan. 14-29. Jan. 29 is late in terms of reading assignments. You could always rely on the library reserve copy until your copy arrives. If you are buying a used copy, then you should be reasonably sure that it is in good condition.

I would like to suggest that if you find a new copy of the text for prices cheaper than some of those listed above, you share that with the class. The easiest way to do that is to send me an email dannemil@rice.edu, and I will post the price and vendor on the course web site, or use the class Forum on Owlspace to report the price and the vendor.